

WE CLAIM:

- 5 1. A method of detecting a biomolecule, comprising the steps of:
providing a substrate, the substrate having at least one
biodetection site including an electrical resonator therein;
applying at least one biochemical probe to the biodetection site;
interacting the biomolecule with the biochemical probe at the
biodetection site; and
10 detecting the biomolecule at the biodetection site.
2. The method of claim 1 further comprising:
applying a magnetic tag to the biomolecule.
- 15 3. The method of claim 1 further comprising:
detecting magnetic properties of the biodetection site with the
resonator.
- 20 4. The method of claim 3 wherein a value of the magnetic
properties of the biodetection site corresponds to a number of biomolecules at
the biodetection site.
5. The method of claim 1 further comprising the step of:
applying a holding substance to the biodetection site.
- 25 6. The method of claim 1 wherein the substrate comprises an
organic substrate with embedded resonance frequency structures.
7. The method of claim 1 wherein the biochemical probe is an
30 oligonucleotide.

8. The method of claim 1 wherein the magnetic tag is ferrocene.
9. The method of claim 1 further comprising:
5 measuring the magnetic properties of the biodetection site
before applying the biomolecule.
10. The method of claim 9 further comprising
determining an alteration in magnetic properties of the
10 biodetection site.
11. The method of claim 9 wherein a value of the magnetic
properties of the biodetection site corresponds to a number of biomolecules at
the biodetection site, further comprising the steps of:
15 correlating a value of the alteration in magnetic properties with a
number of biomolecules; and
determining the number of biomolecules at the biodetection site
based on the value of the alteration.
- 20 12. A method for detecting a biomolecule comprising the steps of:
reacting a biomolecule with a magnetic tag;
contacting the tagged biomolecule to a biodetection site on a
resonator, the site including a solution of at least one probe;
coupling the biomolecule to the probe; and
25 detecting the number of biomolecules at the site.
13. A biosensor for assaying biomolecules, comprising:
a substrate having at least one biodetection site; and
an electrical resonator proximate the biodetection site to allow
30 measurement of magnetic properties at the biodetection site.

14. The biosensor of claim 13 wherein the biodetection site includes a holding substance.

5 15. The biosensor of claim 13 wherein at least one biochemical probe is present at the biodetection site.

16. The biosensor of claim 13 wherein the biodetection site is adapted to receive at least one biomolecule, further comprising:
10 at least one magnetic tag operatively adapted to be applied to the biomolecule.

17. The biosensor of claim 13 wherein the electrical resonator measures a value of magnetic properties, the value corresponding to a
15 number of biomolecules at the biodetection site.

18. The biosensor of claim 13 wherein the electrical resonator has a spiral geometry.

20 19. The biosensor of claim 13 further comprising:
 a measuring component for measuring the magnetic properties in communication with the biodetection site.

20. The biosensor of claim 19 further comprising:
25 at least one quantitating element for correlating an amount of biomolecules at the biodetection site to the magnetic properties of the biodetection site.

21. A kit for assaying target biomolecules, comprising:
a sample plate including a plurality of biodetection sites;
a holding gel adapted to coat the biodetection sites; and
5 an electrical resonator operatively attached to the sample plate
to allow measurement of magnetic properties of the biodetection sites.
22. The kit of claim 21 further comprising:
a solution of at least one biochemical probe adapted to be
10 applied to the biodetection sites.
23. The kit of claim 21 further comprising:
a solution of at least one magnetic tag adapted to be applied to
the target biomolecules.

15